

REMARKS

Claims 4, 6 and 9 are all the claims pending in the present application.

Reconsideration of the application identified in caption, pursuant to and consistent with 37 C.F.R. § 1.111 and in light of the remarks which follow, is respectfully requested.

I. Response to Rejection under 35 U.S.C. § 103

Claims 4, 6 and 9 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 2000-029247 to Nakanishi et al. (JP '247) in view of U.S. Patent No. 5,665,510 to Hattori. Applicants respectfully traverse the rejection for at least the following reasons.

Independent claim 4 recites, a binder resin for toner contains a polyester resin (G), which is obtained by mixing by melting and kneading: 60 to 97 weight parts of a specific polyester type resin (A2); 40 to 3 weight parts of a specific epoxy group containing styrene type resin (B2); 1 to 13 weight parts, based on total 100 weight parts of the polyester type resin (A2) and the epoxy group containing styrene type resin (B2), of wax; and 0.1 to 2.5 mole equivalents of polyisocyanate (D2) as the isocyanate group for total hydroxyl value 1 mole equivalent of polyester type resin (A2).

The present specification demonstrates that the polyester resins obtained by the recited process are superior to those obtained by processes which do not meet the recitations of claim 4. Specifically, as shown in Tables 1-10 of the present specification, Examples 10 and 12-29, which were prepared in accordance with the process recited in present claim 4, provided superior results in terms of the balance of fixing properties, offset-resistant properties and storage (or blocking resistant) properties, as well as environmental stability, compared to Comparative Examples 3-7, Reference Examples 2-10 and Examples 9 and 11, which were prepared by processes not meeting the recitations of claim 4. It is noted that the storage properties correspond to blocking resistant properties (page 3, lines 13 to 14).

The Office Action asserts:

Table 1, Examples 1-4 provide data for composition comprising resin A4 which is different than resin A2 recited in Claim 4.

(page 5, 2nd paragraph of the Office Action).

The Examiner appears to consider that the "resin (A2)" recited in claim 4 is the same as "Resin A-2" described on page 30, 2nd paragraph of the present specification, and that since "Resin A-4," which is described on page 30, 4th paragraph of the present specification, is different from "Resin A-2," "Resin A-4" is not encompassed by the "resin (A2)" recited in claim 4.

Applicants wish to point out that the Examiner misunderstood the claim language. Specifically, claim 4 recites a polyester type resin (A2) having a number-average molecular weight (Mn) of 1000~50000, a hydroxyl value of 4~100 mgKOH/g and an acid value of 1~40 mgKOH/g. That is, the resin (A2) represents a group of resins satisfying the above noted recitations.

On the other hand, as described on page 30, 4th paragraph of the present specification, Resin A-4, which is a specific resin used in Examples 1-4 in Table 1 of the present specification, was obtained from Resin A-1 and tolylene diisocyanate. Resin A-1 was obtained from a mixture of Polyol KB300, ethylene glycol (EG), triethylene glycol (TEG), terephthalic acid (TPA) and benzoic acid (Benz A), and had a hydroxyl value of 22.0 mg KOH/g, an acid value of 2.1 mg KOH/mg and a number-average molecular weight of 2800 (paragraph bridging pages 35 and 36 of the present specification). It can be seen that all of the above noted properties of Resin A-1 fall within the ranges recited in claim 4, with respect to the resin (A2). In other words, it is Resin A-1 which corresponds to the resin A2 recited in present claim 4. However, it is noted that Examples 1-8 in the present specification were

prepared from Resin A-4 or A-5 involving first mixing a polyester resin (Resins A-1, A-2, and/or A-3) and a polyisocyanate (page 30 of the present specification), and thus do not fall within the scope of present claim 4.

Further, the present specification describes at page 2, lines 7 to 3 from the bottom, that the amount of the polyester resin (A2) (and the styrene resin (B2)) is related to the environmental stability. In particular, when the amount of the polyester resin (A) is too high, the environmental stability is inadequate. Therefore, it is believed that Examples 15 to 25 described in the present specification should exhibit excellent properties in terms of environmental stability, compared to Examples 9 and 11.

Reference Examples 9 and 10, which were prepared by processes wherein the amount of the wax was 0 wt.% and 18 wt.%, respectively, both of which are outside the range of 1-13 wt.% recited in present claim 4, showed inferior balance of fixing properties, offset-resistant properties and blocking resistant properties.

Applicants noted a typographical error made in the previous Amendment, which stated that the amount of wax in Reference Example 9 was "1 wt.%" for which Applicants' representative apologizes.

JP '247 describes a toner binder which is a combination of a polycondensation resin (A) and other resin (B). The polycondensation resin (A) can be any of a variety of resins set forth in paragraph [0005] which includes polyester, polyamide, polyurethane, polycarbonate, polyester polyamide, polyester polyurethane, etc. The other resin (B) is described in paragraph [0013] and can again be a variety of different resins, many of which are not styrene type resins. JP '247 does not disclose employing polyisocyanate as an additional component in the composition described therein. Hattori discloses a binder resin containing a resin

having an epoxy group and optionally a conventional binder resin including polystyrene, a styrene-(meth)acrylate copolymer and a polyester (col. 2, lines 61-66).

To the extent that in view of JP '247 and Hattori, a polyester polyurethane is selected as the polycondensation resin (A) and an epoxy group containing styrene type resin is selected as the other resin (B), neither of JP '247 nor Hattori discloses or suggests the above noted features achievable in the presently claimed invention.

The Office Action asserts that "composition disclosed by [JP '247] has styrene based resin **and** polyester based resin in substantially same range as [claimed] in Claim 4," and that Comparative Example 3 (shown in Table 3-2 of the present specification) is directed to a composition "with absence styrene based resin" (page 6, 2nd paragraph of the Office Action).

As noted above, the present invention can achieve the balance of environmental stability and fixing properties and offset resistance properties (see, also, paragraph bridging pages 3 and 4 of the present specification).

The present specification describes on page 2, lines 5 to 3 from the bottom, that one of factors having the negative influence for environmental stability is water-absorption properties due to polarity that originates in the ester group within the resin structure. On the other hand, as described in the specification page 2, lines 7 to 5 from the bottom of the present specification, polyester resin is suitably employed for balance of fixing properties and offset resistance properties.

In the presently claimed invention, to achieve the balance of environmental stability and fixing properties and offset resistance properties, the resin is made of a complex with styrene-acryl bonding. A polyester backbone is made of ester bonding, so that polarity should be high; on the other hand, a styrene backbone is made of carbon-carbon bonding, which is nonpolar.

Further, when there is an appropriate ratio between the polyester portion and the styrene portion in the complex of resin, that is, 60 to 97 wt parts of polyester resin and 40 to 3 wt parts of styrene resin as recited in present claim 4, favorable balance between fixing properties and offset resistance properties which is an advantage by using a polyester resin can be maintained, and in addition, environmental stability can be improved in a binder resin for a toner. These effects are shown in the Examples of the present specification, and discussed above.

JP '247 does not disclose improvement on balance of fixing properties and offset resistance properties and environmental stability. Further, JP '247 merely specifically discloses an embodiment with a styrene based resin as a main component (i.e., 50 wt% or more) which exhibits the desired effect described therein.

Therefore, based on the teachings of JP '247, one of ordinary skill in the art could not have been led to balancing not only fixing properties and offset resistance properties but also environmental stability, or selecting the ratio of polyester resin and styrene resin to arrive at the subject matter recited in present claim 4.

In view of the foregoing, Applicants respectfully submit that claim 4 is patentable over JP '247 in view of Hattori, and thus the rejection should be withdrawn. Additionally, claims 6 and 9 depend from claim 4, and thus are patentable over the cited references at least by virtue of their dependency.

II. Conclusion


From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any

questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

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